SUNY Cortland - Environmental Health and Safety Office
Service Group, Room 108
P.O. Box 2000
Cortland, NY 13045
607-753-2508

SUNY CORTLAND
ENVIRONMENTAL HEALTH
AND SAFETY OFFICE

HAZARD COMMUNICATION and RIGHT-TO-KNOW PROGRAM

PROGRAMS, POLICIES, AND PROCEDURES

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HAZARD COMMUNICATION/RIGHT-TO-KNOW PROGRAM

1. INTRODUCTION

This document represents the Hazard Communication and "Right-to-Know" Program for SUNY Cortland. The program was designed to meet the requirements of both the Federal OSHA Hazard Communication Standard (29 CFR 1900.1200) and the New York State Toxic Substances Information, Training, and Education (NYS Labor Law Article 28 12NYCRR Part 820). The New York State law is also referenced as the "Right-to-Know" law.

This program is specific to the hazards associated with chemical use in the workplace. Users of this program should recognize that many products they use contain a variety of chemicals and other ingredients. Chemicals can be any substance in solid, liquid or gas form that has a defined composition and can be comprised of a single element, a compound, or a mixture. Within this program the terms "product" or "substance" may be used to describe something that contains a chemical or chemicals.

The federal Hazard Communication law applies to all private and public sector workers while the Right to Know law applies to New York State public sector workers. These laws are very similar, and both are based on the concept that employees have both a need, and a right to know, the hazards and identities of hazardous chemicals they use as well as safe work practices to reduce or eliminate exposure.

The NYS "Right-to-Know" law expands on the Hazard Communication standard by requiring employers to have "Right to Know" informational posters throughout the workplace. Additionally, employees must attend annual training on hazard communication and have the right to refuse work with a hazardous chemical if a written request is not responded to within three working days and can do so without the fear of discrimination. Complaints may be made to the Department of Labor (Health and Safety Division) or the NYS Attorney General's Office.

Components of this program include key definitions and toxicological nomenclature, responsibilities, training requirements, chemical inventory and safety data sheet (SDS) access and use, GHS pictograms, secondary bottle labeling requirements, personal protective equipment and engineering controls, and guidelines for safe chemical use. When workers are provided the necessary training, information, and equipment, they can take steps to protect themselves.

This program applies to all campus groups and departments who use hazardous chemicals. It should be noted that this program is not inclusive of all to all hazards that SUNY Cortland employees could encounter or be exposed while working. The EHS office has developed other safety programs to meet the requirements of specific regulations including asbestos, silica, respiratory protection, personal protective equipment, blood borne pathogens, lead, radiation, confined space, walking and working surfaces and fall protection, and laboratory chemical hygiene.

2. REFERENCES

Federal OSHA Hazard Communication Standard (29 CFR 1900.1200) plus Appendices A, B, and C
New York State Toxic Substances Information, Training, and Education (NYS Labor Law Article 28 12NYCRR Part 820).
SUNY Cortland Respiratory Protection Program
SUNY Cortland Chemical Hygiene Program
SUNY Cortland Laboratory Safety Program
SUNY Cortland Personal Protection Equipment Program
SUNY Cortland Compressed Gas Cylinder Safety Policy
SUNY Cortland Art Safety Program
SUNY Cortland Waste Management Program
SUNY Cortland Spill Response Program
A Comprehensive Guide to the Hazardous Properties of Chemical Substances, 2nd Edition, 1999

3. DEFINITIONS

There are many terms and acronyms that will appear throughout this program that appear on safety data sheets and container labels. Definitions of these can be found in Appendix A. All of these definitions have been presented in the context of chemical use, exposure or property and may have alternative or expanded definitions depending on the use. Users of this program should familiarize themselves with these definitions.

4. RESPONSIBILITIES

Environmental Health and Safety Office

- Provide initial and refresher Hazard Communication and Right-to-Know training for employees of departments that use hazardous chemicals.
- Facilitating annual department chemical inventory and maintaining the chemical management database.
- Maintaining up to date Safety Data Sheet (SDS) database.
- Providing labels for secondary containers.
- Posting "Right-to-Know" signage on employee information boards for employees who use hazardous chemicals.
- Providing respiratory protection training, facilitating medical clearance, performing fit test and providing respirators to individuals who require or request respiratory protection.
- Represent the University as the primary resource for questions, concerns, or information related to safe hazardous chemical use.
- Maintaining training, medical clearance and respirator fit test records.
- Updating this program as needed.

Supervisor's and Department Heads

- Supervisors and department heads should ensure that EHS is notified when new employees are hired in their departments so that they receive training prior to their initial assignment if they will be using hazardous chemicals.
- Groups who require mandatory training are staff of facilities operations services (custodial, grounds, maintenance), athletic training, communication disorders, student health services, outdoor pursuits,

Raquette Lake, sciences (chemistry, biology, geology), and art departments who use hazardous chemicals.

- All Facilities Operations Services staff are trained by the EHS office.
- All other departments who wish to conduct training of faculty and staff who use hazardous chemicals should:
    1. Notify the EHS office of new faculty or staff hires if the intent is for EHS to proctor the training, or
    2. Develop and proctor their own training agendas and presentations covering the topics included in this program. If this method is used, a copy of the training agenda and sign-in sheet should be provided to the EHS office.
- Supervisors and Department heads are responsible for providing annual updates to their chemical inventory to the EHS office.

Human Resources Office

- Are required to ensure that all new employees watch and review the video and Environmental Health and Safety document (Biz Library) on Hazard Communication and New York "Right to Know".

Employees

- Employees are responsible for attending scheduled Hazard Communication and Right-to-Know training.
- Confirming they have access to both the chemical management database and Safety Data Sheets.
- Using chemicals safely and avoiding exposure by following manufacturer's instructions and reading labels or SDS for the chemicals they are using.
- Ensuring the secondary containers that they use in their department are properly labeled.
- Using exposure control devices (fume hoods, etc.) and wearing appropriate personal protective equipment as required.
- Reporting accidents, injuries, spills, releases, and other adverse events related to hazardous chemicals they are using.

Contractors

- Contractors who work on campus are responsible for their own Hazard Communication and Right-to-Know programs and training of their employees.
- Contractors must also submit written plans that outline project-specific hazards related to chemical use and associated safety precautions to the EHS Office upon request.
- Within the framework of the Hazard Communication Program, contractors must submit SDS associated with the project to either the FPDC department project coordinator or FOS department supervisor prior to bringing chemicals on campus and commencing work. After receiving project specific SDS, the project coordinator or supervisor will submit these documents to the EHS Office. The EHS Office will review SDS to assess hazards and determine if controls need to be implemented. In instances where a specific chemical is extremely hazardous or possesses an unreasonable risk to human health or the environment, the EHS Office will request that the contractor use a less hazardous chemical or use appropriate engineering controls to eliminate or reduce the hazard(s). During projects, contractors must make sure that their chemicals are appropriately labeled. Additionally, at the end of a project, contractors are required to remove their chemicals from the campus.
- Under no circumstances will the contractors allow the unrestricted release of airborne hazardous chemical fumes, vapors, mists, dusts or equipment exhausts, generated by their activities, to areas

within occupied buildings, in close proximity to building HVAC air intakes or to outdoor areas open to the public.

- Contractors are also responsible for adhering to all other aspects of the SUNY Cortland Contractor Safety Program.

5. CHEMICAL INVENTORY

One of the requirements of the Hazard Communication Standard is that an inventory of hazardous chemicals used by the entity be maintained. The EHS office maintains a chemical inventory database of all chemicals used on campus. Included in the database are all chemicals used by campus groups. These include all known campus chemicals including those categorized as hazardous plus those that pose little to no hazard. This database is available to all campus employees.

ACCESSING THE DATABASE: There are two ways to access this database as follows:

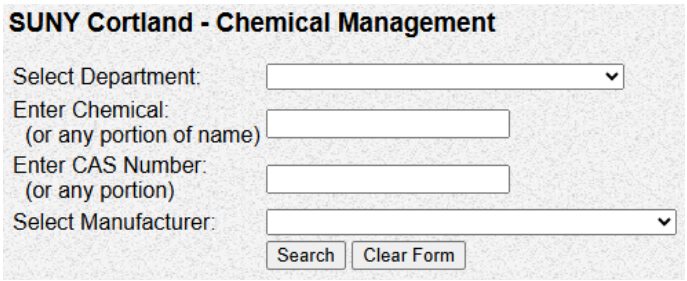
Option 1: Open the direct link to the database: https://colfax.cortland.edu/chemmgmt/

Option 2: Follow the procedure below

- Visit the SUNY Cortland website
- On the top bar select "Offices A-Z"
- Under the Offices column scroll down and select the Environmental Health and Safety Office
- On the right side of the page select Chemical Management Database. See next page for navigating the database.

NAVIGATING THE CHEMICAL MANAGEMENT DATABASE

Once in the database the screen will appear as follows:



From here there are four options to search for a chemical as follows:

1. **Department**: Under Select Department click on the drop-down arrow and choose the department you which to search for a product or chemical. Using this method the entire chemical inventory for that department will appear.
2. **Chemical Name**: Enter the chemical name. Using this method all chemicals by that name contained within the database will appear.
3. **CAS Registry Number**: Enter the CAS number (chemical abstract service) for the chemical. All chemicals with that CAS number contained within the database will appear.
4. **Manufacturer of the Chemical**. Click the drop-down arrow and choose the manufacturer's name. Using this method all chemicals in the database manufactured by that company will appear.

The following is an example of how the database will appear on the computer screen once a search option has been chosen. In this case the search option was by department (Custodial Services).

Department	Chemical (click to see SDS sheet)	CAS number	Manufacturer	Quantity
Custodial Services	1001 Spot Shot	?	WD-40 Company	18 ounce(s) metal can
Custodial Services	3M TB Quat Disinfectant RTU Cleaner	?	3M	1 quart(s) plastic bottle
Custodial Services	A-Ben-A-Qui	?	CleanSource Inc.	20 ounce(s) plastic bottle
Custodial Services	AirX 75 Odor Counteractant	?	Airex Laboratories	1 gallon(s) plastic bottle
Custodial Services	Bab-O Powdered Cleanser	?	Fitzpatrick Bros.	21 ounce(s) cardboard can

CHEMICAL INVENTORY MAINTENANCE AND UPDATES

The chemical inventory is maintained and updated by the EHS office hazardous materials manager and is updated as chemicals are procured or deleted. Each year the EHS office conducts an inventory of chemicals for campus groups and offices who use chemicals. A letter or email is sent to each department head that includes the previous year's inventory along with a request to review this list for changes including new chemicals that have been procured, chemicals that are no longer used, quantities, container types, and locations of chemicals. The revised list is sent to the EHS office and the database is updated along with any SDS that need to be added, updated, or deleted.

6. CONSUMER PRODUCTS AND PERSONAL MEDICATIONS

Some chemicals and substances are generally exempt from Hazard Communication and Right-to-Know rules. These consist of common consumer products and personal medications.

University Supplied Consumer Products

Consumer products provided by the University that are intended to be used in a manner no different than a consumer would use at home are exempt provided they are used as intended. These include common office, classroom, kitchenette and bathroom supplies such as writing instruments (pens, markers, highlighters, chalk, etc.), dry board erase spray, computer screen cleaner, ink cartridges, desktop cleaners, hand sanitizer, hand and dish soap, disinfectant wipes, white out, air freshener, first aid supplies, and eyeglass lens wipes. Many of these items are included in the chemical management database under the "Consumer Product" category and safety data sheet are available.

Personal Consumer Products

Select personal items that are brought into the office or workspace are exempt. These include lotions, creams, cosmetics, fragrances, food and beverages, dietary supplements, personal hygiene supplies, or any other work related item not supplied by the University. It should be noted that an individual may be asked to remove such an item if it is found to be adversely affecting another person due to allergy, odor, or discomfort.

Under no circumstances shall an employee bring a chemical or substance to the workplace that poses a serious health or physical hazard as indicated by the signal word "Danger" on the product label.

If there are any questions or concerns regarding the hazardous nature of personal consumer product the EHS office must be contacted to review and approve before allowing it into the workplace.

Personal Medications

Any personal prescription or over-the-counter medication or treatment that is brought into the office or workplace for medical use by an individual is exempt. All such medications and treatments must be kept secure and under the control of that individual so others cannot access them.

7. GHS PICTOGRAMS AND SIGNAL WORDS

From this point forward, each section of this program will discuss and include the GHS pictograms and signal words. Additional information on the GHS pictograms will be provided in the program sections that discuss safety data sheets, hazardous chemical classifications and bottle labeling.

GHS PICTOGRAMS

GHS pictograms are visual indicators of the hazard(s) associated with a chemical and are designed for users to quickly identify the hazards of a chemical.

If a pictogram, or multiple pictograms, appear on a bottle label or safety data sheet that should indicate an immediate warning to the user of the potential hazards associated with the chemical.

Pictograms may not appear on manufacturer's bottle labels, and you must check the SDS.

Pictograms are divided into physical, health, and environmental hazards. It should be noted that corrosion may represent both a physical and health hazard.

Physical Hazard pictograms constitute the following:

Oxidizer	Flammable	Explosive	Corrosion (metal)	Gas Under Pressure
				

Physical hazards pose a risk of bodily harm by the actions of fire, explosion, combustion, rapid fire acceleration, pressure release, and corrosion. If one of these pictograms appears on a container label or safety data sheet there will be safe use and precautionary guidelines listed.

Health Hazard pictograms constitute the following:

Acute Toxicity	Health Hazard	Exclamation Mark	Corrosion (skin/eyes)
			

Health hazards pose a risk of toxic effects, bodily harm, disease, organ damage, irritation, mutation, reproductive toxicity, and aspiration. If one of these pictograms appears on a container label or safety data sheet there will be safe use and precautionary guidelines listed.

Environment pictogram:

Environment


The environment pictogram means the chemical is toxic to living organisms, animals and plants if released onto the ground or into waterways. Always check SDS Section 13 (Disposal Considerations) to determine the proper method of disposal of a chemical with the environment pictogram.

SIGNAL WORDS

There are only two signal words "Warning" and "Danger". These will appear in section 2 of the safety data sheet and on manufacturers labels. If either of these two signal words appear that means there is a health or physical hazard associated with the chemical. If there is no signal word, or the word "None" appears that typically means there are no hazards associated with the chemical.

"Warning"

The signal word "Warning" will appear if there is a known health or physical hazard but the potential for serious injury or illness is not as great as those chemicals with "Danger". These will typically be chemicals pose the risk of irritation, lower flammability, slight irritants, narcotic effects, low toxicity, and reversible conditions.

"Danger"

The signal word "Danger" will appear if there are known hazards and the potential for serious injury or illness is great or serious. These include chemicals that pose either health or physical hazards including the risk of severe acute toxicity, disease, high toxicity to body systems or specific organs, extreme flammability, explosion, permanent or irreversible eye damage, highly corrosive, asphyxiation, or are immediately dangerous to life and health at low concentrations.

Additional information will be provided on precautionary measures that need to be taken for any chemical with a signal word indicated.

8. SAFETY DATA SHEETS (SDS)

Safety data sheets are written by either the manufacturer, supplier, or importer of the chemical and provide the end user with critical safety related information. It is the responsibility of the employer to make safety data sheets available to the end user of the chemical. The purpose of this section is to:

- Inform employees of the University how to access safety data sheets.
- Provide a review of each section of a safety data sheet (Users Guide).

ACCESSING SDS

Safety data sheets for campus chemicals are available to all employees. There are several options for accessing safety data sheets including:

1. Chemical Management Database
2. Printed SDS from the EHS office files
3. Printed SDS in three ring binders located in select departments

Chemical Management Database

SDS's can be accessed within the Chemical Management Database by simply clicking on the chemical (red font) in the table. By doing this the SDS will open and appear for review or print.

All new employees who work in departments that use chemicals are trained in the process of accessing and using the chemical management database method to view safety data sheets.

Printed SDS from the EHS office files

The EHS office maintains an inventory of current SDS in print form. These are stored within file cabinets within the EHS office located in room 108 of the Service Group building. Anyone in need of an SDS can visit in person or call (X2508) the EHS office during normal business hours (M-F 8-4:30pm).

Printed SDS in Binders

Printed SDS are available in each building. These binders contain SDS for chemicals used by cleaning and custodial staff and are kept in either the custodial supervisor's office or in a custodial break room. These binders are updated as needed by the EHS office when changes to cleaning products are made.

SAFETY DATA SHEET USERS GUIDE

SDS provide a wealth of information about that chemical including ingredients, hazards, safety, physical data, exposure controls, PPE requirements, waste disposal and other information. Chemical manufacturers and distributors are required to supply SDS to their customers by federal mandate.

In 2015 safety data sheets were revised to conform to the Global Harmonized System or GHS. This revision included a name change from material safety data sheets (MSDS) to safety data sheets (SDS). It also included a worldwide format change, so all SDS include the same 16 sections. In addition, GHS pictograms were developed and appear on SDS. The sections of an SDS are as follows:

1. Product and Company Identification	9. Physical and Chemical Properties
2. Hazards Identification	10.Stability and Reactivity
3. Composition, Ingredients Information	11. Toxicological Information
4. First aid Measures	12. Ecological Information
5. Fire Fighting Measures	13. Disposal Considerations
6. Accidental Release Measures	14. Transport Information
7. Handling and Storage	15. Regulatory Information
8. Exposure Controls, Personal Protection	16. Other Information

Some older chemicals in our database will have an MSDS posted instead of an SDS. These are primarily for older chemicals and substances that are no longer manufactured. Most MSDS did not conform to the modern GHS system and the various sections may not be in the same order. In addition, pictograms will not appear on an MSDS.

The following will provide an overview of information contained in each section of an SDS.

Section 1: Product and Company Information

This section provides the name of both the manufacturer and the name of the product. Also contained in this section is contact information such as the manufacturer's address, website and contact information. This section is where a user should confirm they have the correct SDS for the product they are researching by matching information from the SDS to the product container label.

Section 2: Hazards Identification

This section identifies any hazards associated with the product. This is a very important section of an SDS and should always be reviewed by users before using the product or chemical.

Hazards may be presented in several different forms designed for the user to quickly identify and avoid the hazards. If there are associated hazards there will be both visual ques and statements that will include:

- GHS pictograms: Red diamonds with symbols

- OSHA Hazard Class: If there is a hazard associated with the chemical the specific hazard(s) will be indicated along with the category of hazard. Hazard categories are divided into physical and health. Each hazard is further delineated based on level of severity ranking system. Health hazards use a numerical system (1 through 4) with 1 being the most severe hazard and 4 being the least severe. Some health hazard classes are structured slightly differently and have letter suffixes (eg. 1A, 1B, 2A, 2B) that further delineate the severity of the hazard. Physical hazards are classified by a similar system. A complete listing of the hazard classes and categories are provided in Section 8 of this program.
- Signal Words: There are only two - Danger or Warning
- Hazard Statements: Describe the causal effects of exposure to the chemical. These statements include irritation, eye damage, drowsiness, dizziness, diseases, damage to target organs, etc., and
- Precautionary Statements: Describe recommended measures to take to minimize or prevent adverse effects resulting from exposure to the chemical.

It should be noted that some products are purchased in concentrated form and are intended to be used in a dilute form (i.e. mixed with water). This applies to many cleaning products that are purchased in bulk and use dispensing systems to mix the concentrated product into dilute form for use. The SDS may be indicate the hazards associated with that product in concentrated form and not in the diluted form as used.

Section 3: Composition/Information on Ingredients

This section focuses on the chemicals and substances contained in the product. This is typically presented in a table format with each ingredient's name, the percentage (%) of that ingredient in the product and the CAS number. By reviewing this information one can determine the percentage of each ingredient.

Users may also encounter a product where an ingredient is listed as "Proprietary" or "Trade Secret". This can be problematic in that the exact ingredient is not being disclosed. In these cases, OSHA still requires that information about the properties and effects of any hazardous chemicals still be disclosed. If a user has any questions about an ingredient listed as proprietary or trade secret, you should contact the EHS office for guidance and clarification.

Section 4: First Aid Measures

This section is very important and will provide guidance on actions to take in the event of exposures to the eyes, respiratory system, skin contact, injection or ingestion. Included will be signs of exposure and important first aid measures that should be taken in the event of an exposure.

Section 5: Fire Fighting Measures

This section provides information on how to extinguish a fire associated with the product or chemical. Much of the information contained here is intended for responders.

Section 6: Accidental Release Measures

This section provides guidance in the event of a spill of the chemical or product and provides precautionary measures as well as actions to be taken by both emergency responders. Typical information includes spill containment, methods for clean-up, disposal measures, and personal protective measures that should be taken.

Section 7: Handling and Storage

This section provides valuable information on the safe handling and storage of the product or chemical. Depending on the chemical, some must be stored separately from other chemicals and not mixed with

other chemicals. Information will also be provided on the proper container to be used if the product is to be transferred to a secondary container for use. If the product is heat or cold sensitive this information will be provided. Additional precautionary statements may also be provided, and users of the chemical should adhere to these.

Section 8: Exposure Controls and Personal Protection

This section contains information about regulatory exposure limits, exposure controls, and personal protective equipment that should be used to minimize or prevent exposure when using the chemical.

Exposure Limits

This can be a very complicated section to interpret. The one key takeaway that all users of hazardous chemicals need to know is if there is an exposure limit listed for the chemical, or chemicals, contained in the product then the product is deemed an inhalation or skin exposure hazard.

If the product contains a chemical with an established regulatory exposure limit it will be listed in this section. Most exposure limits are based on inhalation of a chemical in vapor, fume, dust, or particulate form. There are also some chemicals with exposure limits for skin exposure.

Exposure limits are established by several governmental agencies and professional organizations including OSHA, NIOSH, and the ACGIH. The basic premise of exposure limits is to establish a threshold level that should or cannot be exceeded over the course of a typical work day (8 hours) or for a specific duration of time. Each agency or organization uses different terminology for these threshold levels.

- OSHA: Permissible Exposure Limit (PEL): Based on an 8 hour "Time Weighted Average" or "TWA" for airborne. This 8 hour period is designed to represent a typical work day. PEL's are the only exposure limit that can result in a fine to an employer if they are exceeded.
- NIOSH: Recommended Exposure Limits (REL). NIOSH is a research branch of the federal government that studies toxicological effects of chemicals and other agents and publishes REL's and other exposure data.
- ACGIH: Threshold Limit Values (TLV). The ACGIH is a private organization that also studies the toxicological effects of chemicals and agents and publishes TLV's and other exposure data.

Both REL's and TLV's are structured similar to OSHA PEL's with the same 8 hour exposure baseline.

It should be noted that there are many other exposure limits established by all three entities including short term exposure limits (STEL's), Ceiling Limits (Ceil). If a limit is listed as a TWA the assumption can be made that it is an 8 hour TWA unless otherwise specified. STEL's are short term exposure limits typically based on a 30 minute exposure duration. Ceiling limits (Ceil) are short term limits that cannot be exceeded at any time during a workday.

Exposure Limit Units

Exposure limits can be expressed in several different units depending on the physical state of the contaminant. These include:

- ppm = Part per million (applies to gases and vapors)
- ppb = Part per billion (applies to gases and vapors)
- ug/m^3 = Micrograms per cubic meter (this is the equivalent of ppb) (applies to dusts and mists)
- mg/m^3 = Milligrams per cubic meter (this is the equivalent of ppm) (applies to dust and mists)
- F/cc = Fibers per cubic centimeter (specific to asbestos)

Personal Protection

Section 8 will also provide information on engineering and environmental exposure controls that should be employed when using the chemical and is divided into engineering controls and individual exposure controls. Recommended personal hygiene measures will also be indicated.

Engineering controls may include recommendations for using the chemical within enclosures, local exhaust ventilation, fume hoods, and other controls to prevent worker exposures above statutory (exposure) limits.

Individual exposure controls are those items that are worn by the user of the chemical to protect the hands, body, eyes, skin and respiratory system. This section will indicate the type of protective apparel and devices that should be worn while using and handling the chemical (gloves, goggles, coveralls, respirators and masks, etc.).

Section 9: Physical and Chemical Properties

This section provides information on the physical state of the chemical (liquid, solid, gas), general appearance including color and odor, and other properties associated with the chemical.

Many of these properties will not appear to be immediately relevant to the user of the chemical but there are some key chemical properties that all should be reviewed.

Odor Threshold is the lowest concentration of a chemical that can be detected by the human sense of smell. If you can smell the chemical, you can be confident that the airborne concentration is at or above the odor threshold. ***It should be noted that there are some chemicals with an odor threshold very close to exposure limits***.

pH is a measure of the acidity or caustic (basic) nature of the chemical. pH is based on a scale from 0-14 with 7 being neutral, 0-6 being acidic, and 8-14 being caustic. The extreme ends of the scale are the most hazardous (0-3 and 11-14) and users should always take precautions when using these chemicals due to the extreme corrosive nature to living tissue.

Flashpoint is a temperature at which a liquid chemical releases sufficient vapor to be considered flammable. A chemical with a flashpoint of 199.4 F or lower is classified as flammable (OSHA).

Additional discussion of many of other physical and chemical properties are further discussed in the definitions provided in appendix A and Section 5 of this program (GHS Pictograms).

Section 10: Stability and Reactivity

This section provides important information regarding conditions to avoid, materials and chemicals that are incompatible if mixed resulting in an undesired or dangerous reaction, and decomposition products that might be created through extended storage.

For more information on mixing chemicals and mixtures see toxicological information on the next page.

Section 11: Toxicology Information

This is an important but complicated section that provides information on the toxicological effects of exposure to the chemical via inhalation, skin (dermal) contact, eye contact, injection, or ingestion.

This section will also discuss the toxicological effects of short and long term exposures, delayed or narcotic effects, and the chemical's status as a carcinogen, mutagen, reproductive toxin, sensitizer, or irritant. Information will also be provided if exposure could target a certain body organ.

Key pictograms to look for to quickly determine if a chemical may have toxic effects or pose a serious health hazard are:

		
Skull and Crossbones	Exclamation Mark	Health Hazard
Severe Acute Toxicity (Fatal or Toxic)	Harmful Acute Toxicity Skin Irritant/Irritation/Corrosion Eye Irritation Dermal Sensitizer Narcotic Effects Respiratory Tract Transient Target Organ Irritation, Drowsiness, or Dizziness	Carcinogen Respiratory Sensitizer Reproductive Toxicity Target Organ Toxicity Germ Cell Mutagenicty Aspiration Toxicity

LD50 and LC50

If the skull and crossbones pictogram is shown, then terms such as lethal dose 50 (LD50) and lethal concentration 50 (LC50) will appear in the toxicology section if such data is available. These are typically based on animal studies and will list the dose that could result in death of 50% of that animal population exposed to the chemical. In theory the lethal dose data can be carried over to humans.

LD50's are typically presented in mg/kg units and represent the amount of the chemical taken orally (ingested) or in contact with skin (dermal) with "mg" representing the amount of chemical and "kg" representing the bodyweight of the animal. LC50's represent concentrations of a chemical that is inhaled (vapor, gas, dust, etc.) and are typically presented in mg/L or mg/m^3 units with "mg" representing the bodyweight of the animal and "L" or "m^3" representing the concentration of the chemical is air.

Lethal dose toxicities are classified by categories (1 through 4) with 1 being the most toxic to 4 being less toxic.

Users should pay close attention to chemicals with LD values in the highly toxic categories and use these chemicals by following the recommendations for handling, exposure controls, and personal protective equipment.

Mixtures

Some chemicals are mixtures as received or are designed to be mixed (by the end user) with other chemicals or substances. Mixtures can have an overall toxicity that could be greater, lower, or the same as the single chemical.

Mixing is common with custodial cleaning agents that are received in concentrated form and are designed to be batch mixed with water resulting in a diluted solution. Most of these solutions diluted in water will have a lower potential for toxic effects than the concentrated form of the chemical. However, this may not be stated on the safety data sheets which may only provide toxicity data for the chemical in concentrated form. It is important that any chemical subject to mixing with another substance only be done according to the manufacturer's instructions.

Below are some common chemicals and substances that, when mixed, can result in the creation of toxic gases or adverse conditions and **should never be mixed**.

- Bleach with either vinegar, ammonia, or rubbing alcohol
- Hydrogen peroxide with either vinegar, ammonia, ammonia carbonates, iodides, or sulfites
- Baking soda with vinegar

There are many other examples of mixtures of incompatible chemicals and users should reference Section 10 (Stability and Reactivity) of the safety data sheet to determine these incompatibilities.

Section 12: Ecological Information

This is an important but often overlooked section that provides information on the toxicity of the chemical to the environment including animals, plants, organisms, waterways, and drinking water.

If the environment pictogram appears on the safety data sheet you should reference this section as well as disposal considerations.

Environment

Key information and properties will be provided such as:

- Persistence and Degradability: How long will the chemical last in the environment and will it degrade over time
- Bioaccumulation and Accumulation: This has to do with a chemical's ability to build up in an organism. Common examples of chemicals that can bioaccumulate are PCB's, pesticides, dioxins, lead, and mercury.
- Mobility: This is a measure of how far a chemical my travel once released into the environment through water, soil and the atmosphere.

Users of hazardous chemicals should pay attention to this section so they can avoid dumping a chemical with a ecological hazard down a storm sewer or onto the ground.

Section 13: Disposal Considerations

This section will include important information on proper disposal methods and will indicate if a waste contains the chemical must be disposed as hazardous or other waste.

Users should always check for the environment pictogram before disposing any chemical.

Section 14: Transportation Information

This section will include information for those involved in the shipping and transport of the chemical. Key items that must appear on shipping containers and manifests are provided including:

- UN No.: The United Nations number assigned to a specific chemical
- Proper Shipping Name: Some chemicals can have different names and the indicated Proper Shipping Name is the one that should used
- Hazard Class: The department of transportation (DOT) has 9 hazard classes (1 through 9). Within these classes are divisions that further define the hazard.
  - Class 1: Explosives (Divisions 1.1 through 1.6)
  - Class 2: Gasses (Divisions 2.1 through 2.3)
  - Class 3: Flammable Liquids
  - Class 4: Flammable Solids (Divisions 4.1 through 4.3)
  - Class 5: Oxidizing Substances and Organic Peroxides (Divisions 5.1 and 5.2)
  - Class 6: Toxic and Infectious Substances (Divisions 6.1 and 6.2)
  - Class 7: Radioactive Materials
  - Class 8: Corrosive Substances
  - Class 9: Miscellaneous Dangerous Goods, Materials, or Articles
- Packing Group: Is a numerical ranking of the degree of danger posed by a chemical deemed hazardous. There are 3 packing groups (I, II, III) with group I representing the great danger, group II representing a medium danger, and group 3 representing a minor danger

Section 15: Regulatory Information

This section contains a wide variety of information including state and federal statutes to which the chemical is regulated. These statutes cover health, safety, and environmental regulations and are primarily used by occupational health and safety professionals, environmental specialists, and regulatory compliance officers.

Section 16: Other Information

This is the last section of a safety data sheet and may contain any other information deemed necessary to provide. Typically, this is where information on the preparer of the safety data sheet is included along with any disclaimers.

Comprehending and interpreting the data and information on safety data sheets can be very difficult. Employees are always encouraged to contact the EHS office any time there is a question about the safe use, handling, or disposal of a chemical they are using.

9. HAZARD CLASSIFICATIONS AND SAFE USE GUIDELINES

One of the primary goals of a Hazard Communication and Right-to-Know program is to ensure users of hazardous chemicals can readily recognize the hazards of the chemicals they are using and take necessary measures to protect themselves from exposure and physical hazards.

Hazardous chemicals are divided into two groups and include those posing health and physical hazards.

There are many governmental agencies and organizations that define the hazardous nature of chemicals specific to the purpose of that agency or organization. Thes include OSHA, EPA, and DOT. To simplify discussion, this section will focus on the OSHA criteria for chemical hazard determination as outlined in Appendices A, B, and C of the Hazard Communication Standard. Appendix A covers the classifications of the health hazards that can be posed by chemicals while Appendix B covers the classifications of the physical hazards. Appendix C covers the labeling rules.

Hazard classifications, whether health or physical, are based on known or suspected toxicological data or the inherent physical characteristics of the chemical. A chemical may pose no hazard, a health hazard, a physical hazard, or both health and physical hazards. Many products are comprised of multiple chemicals (mixtures) and the hazards posed by these may be increased or decreased depending on the chemical composition of that mixture.

Below is a listing of both health and physical hazards.

Health Hazard Classifications

- Acute Toxicity
- Skin Corrosion/Irritation
- Serious Eye Damage/Eye Irritation
- Respiratory or Skin Sensitization
- Germ Cell Mutagenicity
- Carcinogenicity
- Reproductive Toxicity
- Specific Target Organ Toxicity (single and prolonged exposure)
- Aspiration Hazard
- Simple Asphyxiants

Physical Hazard Classifications

- Explosives
- Flammables (gases, aerosols, liquids, solids)
- Oxidizers (gases, liquids, solids)
- Gases Under Pressure
- Self-Reactive Chemicals (flammable and explosive hazard)
- Pyrophoric Liquids and Solids (flammable hazard)
- Self-Heating Chemicals (flammable hazard)
- Water Reactive Chemicals (flammable hazard)
- Organic Peroxides (flammable and explosive hazard)
- Corrosives (to metal)

With so much information contained on a safety data sheet it can be difficult for someone to quickly recognize the hazards posed by a chemical and precautionary measures that should be taken to prevent exposure or adverse physical reaction. The purpose of this section is to simplify the process of hazard recognition. The tables on the following pages will provide a review of each hazard classification. They are grouped by health and physical hazards and each table includes:

- **Hazard Classification**: The name of the hazard classification
- **Criteria for Hazard Categorization:** Health hazards are based on toxicological data and physical hazards are based on physical properties and test data of the chemical.
- **Hazard Categories:** These are rankings based on the criteria expressed as words or numerals from the most severe to less severe.
- **Signal Words:** There are only 2 signal words – "Danger" or "Warning". "Danger" signifies a higher hazard threat than "Warning".
- **Hazard Statements:** Short descriptions of the severity of each hazard category and what can happen if exposed or subject to an adverse condition.
- **Pictograms:** These are the pictograms that will appear on a safety data sheet for each hazard category.
- **Campus Users:** General comments on the prevalence and use of chemicals and substances by campus groups for that hazard classification. In some cases specific chemicals are cited.
- **Precautionary Statements and Safe Use Guidelines:** These are precautionary statements specific to each hazard class about safe chemical use, precautionary measures to prevent exposure or adverse condition, personal protective equipment, engineering controls, emergency and first aid response, safe handling, storage, and disposal.

HEALTH HAZARDS

SEVERE ACUTE TOXICITY

Description:	These chemicals could result in immediate adverse health effects or death if ingested, skin contact, or inhaled.			
Criteria for Hazard Categorization:	Based on Chemical Specific Toxicology Data and Route of Entry			
Severity Scale:	Most Severe			Less Severe
Hazard Categories:	1	2	3	4
Signal Words:	Danger	Danger	Danger	Warning
Hazard Statements:	Fatal	Fatal	Toxic	Harmful
Pictogram(s):				
Campus Users:	Chemicals posing severe acute toxicity are used by several campus groups. The majority of these chemicals are hazardous at the lower end of the severity scale in hazard categories 3 and 4. However, there are some in hazard categories 1 and 2 that can pose a significant hazard, particularly if ingested. Users of chemicals posing severe acute toxicity hazard should follow safe use guidelines listed in the safety data sheet under Section 8, Exposure Controls and Personal Protection.			
Precautionary Statements and Safe Use Guidelines:	• **Inhalation Hazard: C**hemical should only be used within a fume hood or with local exhaust ventilation. If neither of these two engineering controls are feasible then respiratory protection is mandatory. • **Dermal Hazard: P**recautions should be taken to protect skin, body, and eyes by wearing appropriate personal protective equipment such as gloves, body suits, goggles, and face shields. • **Ingestion Hazard: C**hemical should not be ingested. • In the event of an uncontrolled spill or release of an acutely toxic chemical inside a building that has an inhalation hazard, the building should be immediately evacuated, emergency responders contacted (call 911) and no one should enter without appropriate respiratory protection. • All users of acutely toxic chemicals should practice good hygiene procedures by not eating or drinking when using the chemical and washing hands after handling. • Acutely toxic chemicals should be stored in a secure location such as a locked cabinet with restricted access to those authorized to use that chemical.			

SKIN CORROSION/IRRITATION

Description:	These are chemicals that are corrosive or irritating to the skin. Exposure by skin contact (dermal) could result in adverse health effects depending on the chemical and duration of skin exposure.			
Criteria for Hazard Categorization:	Contact Time			
	≤3 min.	>3 min. ≤1 hr.	>1hr. ≤4hr	Irritation
Severity Scale:	Most Severe			Less Severe
Hazard Categories:	1A	1B	1C	2
Signal Words:	Danger	Danger	Danger	Warning
Hazard Statements:	Causes Severe Skin Burns and Eye Damage			Irritation
Pictogram(s):				
Campus Users:	Many campus groups use chemicals that pose a skin corrosion or irritation hazard. These chemicals are typically strong acids or bases in the low or high ends of the pH scale.			
Precautionary Statements and Safe Use Guidelines:	• Protect skin and eyes by wearing appropriate PPE as necessary (gloves, goggles, and body protection). • In the event of skin contact promptly rinse the contact area with water. For eye contact use an eyewash. • Chemicals posing skin corrosion or irritation should never be consumed. • Strong acids and bases can emit hazardous fumes and should only be used in fume hood. The safety data sheet will indicate proper usage in the precautionary statements. • Practice good hygiene procedures both during and after use by not eating or drinking when using the chemical and washing hands after handling. • Strong acids and bases should always be stored in secure chemical storage cabinets.			

HEALTH HAZARDS

SERIOUS EYE DAMAGE/EYE IRRITATION			
Description:	These are chemicals that, if come into contact with the eye, could result in permanent damage, temporary damage or irritation.		
Criteria for Hazard Categorization:	Based on Chemical Specific Toxicology Data		
Severity Scale:	Most Severe		Less Severe
Hazard Categories:	1	2A	2B
Signal Words:	Danger	Danger	Warning
Hazard Statements:	Serious Eye Damage	Serious Eye Irritation	Eye Irritation
Pictogram(s):			None
Campus Users:	Many campus groups use chemicals that pose serious eye damage or eye irritation hazard. These chemicals are commonly strong acids or bases in the low or high range of the pH scale. Another very common campus chemical that poses a risk of serious eye irritation is Isopropyl Alcohol used by many departments		
Precautionary Statements and Safe Use Guidelines:	• Always wear safety goggles —Not safety glasses • Always know where the nearest eyewash station is located. Know how to operate it and confirm it is operational before using the chemical. • If your eyes are exposed to an eye damaging chemical always seek medical attention afterwards even if you use an eyewash and there is no immediate eye discomfort. Remember, some chemicals are not water soluble and chemical residue will remain after using an eyewash. • All users of chemicals that can pose serious eye damage or eye irritation should practice good hygiene procedures both during and after use by not eating or drinking when using the chemical and washing hands after handling.		

RESPIRATORY OR SKIN SENSITIZATION		
Description:	Sensitization occurs when the body reacts to a chemical with an immune response resulting in an adverse allergenic reaction to either the skin or the respiratory system. If you are exposed to a chemical that causes an adverse sensitization reaction, you will have a much higher risk of experiencing adverse reactions in the future even if the exposure is low.	
Criteria for Hazard Categorization:	High Frequency	Low Frequency
Severity Scale:	Most Severe	Less Severe
Hazard Categories:	1A	1B
Signal Words:	Danger	Warning
Hazard Statements:	May Cause Allergy or Asthma Symptoms or Breathing Difficulty	May Cause Allergic Skin Reaction
Pictogram(s):		
Campus Users:	Many college groups use chemicals and substances that pose a risk of respiratory or skin sensitization. A common example of a sensitizing chemical are isocyanates which are found in epoxy resins used by FOS, Arts, and the sciences. There are also many other common chemicals and substances that can cause sensitization.	
Precautionary Statements and Safe Use Guidelines:	• Always protect the skin from direct contact to a skin sensitizing chemical. This may include chemical resistant gloves, body suit, and goggles. • Avoid breathing dust, fumes, mist, vapors, or sprays from sensitizing chemicals. • Follow SDS guidelines and use respiratory sensitizers in a well-ventilated area, within a fume hood, or use respiratory protection for chemicals that pose respiratory sensitization hazard. • All users of chemicals that can pose respiratory or skin sensitization should practice good hygiene procedures both during and after use by not eating or drinking when using the chemical and washing hands after handling.	

HEALTH HAZARDS

GERM CELL MUTAGENICITY

Description:	These chemicals can induce mutations to human germ cells (eggs and sperm) that means exposure could result in adverse effects to a person's reproductive system.		
Criteria for Hazard Categorization:	Known	Regarded	Concern
Severity Scale:	Most Severe		Less Severe
Hazard Categories:	1A	1B	2
Signal Words:	Danger	Danger	Warning
Hazard Statements:	May Cause Genetic Effects	May Cause Genetic Effects	Suspected of Causing Genetic Effects
Pictogram(s):			
Campus Users:	Several campus groups use substances that contain chemicals that pose a risk of germ cell mutagenicity. In particular, the grounds department that uses various herbicides and pesticides.		
Precautionary Statements and Safe Use Guidelines:	• Users should obtain special instructions before using these substances. • Do not handle these substances until all safety precautions have been read and understood. • Wear protective gloves, protective clothing, eye protection, and face protection. • These substances should be store in a secure location such as a locked cabinet or room. • If you are exposed, seek medical attention even if there are no immediate effects		

CARCINOGENICITY

Description:	If a chemical has been determined to be carcinogenic that means exposure could result in cancer. There are many forms of cancer, and the type and risk of contracting cancer will depend on toxicological data and the exposure route of entry.		
Criteria for Hazard Categorization:	Known	Presumed	Suspected
Severity Scale:	Most Severe		Less Severe
Hazard Categories:	1A	1B	2
Signal Words:	Danger	Danger	Warning
Hazard Statements:	May Cause Cancer	May Cause Cancer	Suspected of Causing Cancer
Pictogram(s):			
Campus Users:	Several campus groups use substances that contain chemicals that pose a risk of cancer. The most common is gasoline used by FOS staff to fuel vehicles and powered equipment. Gasoline contains a small quantity of a compound called Benzene, which is a class 1A carcinogen. Many other chemicals are used by the arts and sciences that pose a cancer risk. Although not a chemical used by campus groups, asbestos is present in and on some of the college buildings. Asbestos is a class 1A carcinogen and all campus groups who perform tasks that could disturb asbestos containing materials attend asbestos awareness training so they can avoid disturbing these materials and reduce exposure to asbestos.		
Precautionary Statements and Safe Use Guidelines:	• Regardless of the class or category, users of these chemicals and substances should always use with caution and follow safety precautions outlined in the SDS to avoid exposure. • Avoid breathing vapors, keep off bare skin, and never ingest or inject these chemicals. • Always wear proper PPE and use in a well-ventilated area or within fume hood as indicated. In some cases, respiratory protection might be recommended and should be worn.		

HEALTH HAZARDS

REPRODUCTIVE TOXICITY

Description:	If a chemical has been determined to represent reproductive toxicity that means exposure could result in adverse effects to the fertility of a person, to an unborn child, or may cause harm to breast fed children.			
Criteria for Hazard Categorization:	Known	Presumed	Suspected	Effects on or Via Lactation
Severity Scale:	Most Severe			Less Severe
Hazard Categories:	1A	1B	2	None
Signal Words:	Danger	Danger	Warning	None
Hazard Statements:	May Damage Fertility or Unborn Child	May Damage Fertility or Unborn Child	Suspected to Damage Fertility or Unborn Child	May Cause Harm to Breast Fed Children
Pictogram(s):				None
Campus Users:	Substances that contain chemicals that pose a risk of reproductive toxicity are used by several campus groups including art and chemistry. These include various heavy metals (cadmium, lead, mercury), pesticides used by the grounds department, and organic solvents such as toluene and hexane used by the sciences. In addition, there are other sources of lead and mercury on campus including paints (lead), thermostats, switches, thermometers, barometers (mercury), and light bulbs (mercury). Care should always be taken when handling these items to prevent exposure.			
Precautionary Statements and Safe Use Guidelines:	• Regardless of the class or category, users of these chemicals and substances should always use with caution and follow safety precautions outlined in the SDS to avoid exposure. • Avoid breathing vapors, keep off bare skin, and never ingest or inject these chemicals. • Always wear proper PPE and use in a well-ventilated area or within fume hood as indicated. In some cases, respiratory protection might be recommended and should be worn.			

ASPIRATION

Description:	If a chemical has been determined to represent an aspiration hazard that means exposure could be severely acute resulting in pneumonia, pulmonary injury, or even death if the chemical is swallowed and enters the airways. Aspiration is when a chemical of liquid or solid form enters the body through the oral or nasal cavity and then enters the upper respiratory tract.
Criteria for Hazard Categorization:	Known
Hazard Categories:	1
Signal Words:	Danger
Hazard Statements:	May be Fatal if Swallowed and Enters Airways
Pictogram(s):	
Campus Users:	Chemicals posing an aspiration hazard are used by several campus groups including the motor pool, HVAC, custodial, and the science departments. Chemicals that pose an aspiration hazard include some hydrocarbons and chlorinated solvents. Specific examples of hydrocarbons are turpentine, pine oil, and petroleum distillates.
Precautionary Statements and Safe Use Guidelines:	• Avoid allowing that chemical to enter the nose or mouth. • Particular attention should be paid to chemicals in spray or aerosol containers and never direct the spray towards the face or spray overhead. • In some cases, respiratory protection might be recommended when using these chemicals. • If you are exposed, seek medical attention even if there are no immediate effects.

HEALTH HAZARDS

SPECIFIC TARGET ORGAN TOXICITY

Description:	If a chemical has been determined to represent specific target organ toxicity that means exposure could result in adverse effects to a specific organ or system such as the skin, blood, liver, kidneys, lungs, or central nervous system. Single exposure scenarios would result in adverse effects to an organ immediately after the exposure (acute) whereas a repeat exposure scenario would result in delayed adverse effects to an organ after multiple exposures (chronic).		
Exposure Frequency	Single Exposure		
Criteria for Hazard Categorization:	Significant	Presumed	Transient
Severity Scale:	Most Severe		Less Severe
Hazard Categories:	1	2	3
Signal Words:	Danger	Warning	Warning
Hazard Statements:	Causes Damage to Organs	May Cause Damage to Organs	May Cause Respiratory Irritation, Drowsiness, or Dizziness
Pictogram(s):			

Exposure Frequency	Repeat Exposure	
Criteria for Hazard Categorization:	Significant	Presumed
Severity Scale:	Most Severe	Less Severe
Hazard Categories:	1	2
Signal Words:	Danger	Warning
Hazard Statements:	Causes Damage to Organs	May Cause Damage to Organs
Pictogram(s):		
Campus Users:	There are many chemicals used by campus groups that are toxic to specific organs. The majority of these are used by the chemistry, biology, geology, and art departments. Examples include halogenated hydrocarbons, mercury, benzene, cresols, chloroform, toluene, nickel and nickel compounds, cyanides, and nitrobenzene	
Precautionary Statements and Safe Use Guidelines:	• Regardless of the class or category, users should always use with caution and follow safety precautions outlined in the SDS to avoid exposure. • Avoid breathing vapors and dusts, and keep off bare skin, and never ingest or inject these chemicals. • Always wear proper PPE and use in a well-ventilated area or within fume hood as indicated. In some cases, respiratory protection might be recommended and should be worn. • If you are exposed, seek medical attention even if there are no immediate effects.	

SIMPLE ASPHYXIANTS

Description:	There is no GHS health hazard classification or pictogram for simple asphyxiants. Simple asphyxiants are not normally toxic but have the ability to displace oxygen. This most often occurs in enclosed spaces with little ventilation where there is a large source of asphyxiant gas is released into that space. If such a condition occurs and the oxygen is depleted below 19.5% adverse health effects will start to occur. If the oxygen levels continue to lower unconsciousness and death could result.
Campus Users:	Simple asphyxiants are used by many campus groups, most often in compressed bottle form within laboratories, automotive and maintenance shops, food services, and possibly shipping (dry ice). Common examples are nitrogen, helium, neon, argon, krypton, and xenon. Another common asphyxiant is carbon dioxide, commonly used in soda machines to carbonate the beverage and dry ice used for cold shipping or storage. Some campus locations have continuous oxygen monitoring equipment that will alarm if oxygen levels drop below 19.5%.
Precautionary Statements and Safe Use Guidelines:	• Always make sure the locations where asphyxiants are used are well ventilated. • Ensure there are no gas leaks in the plumbing or valve and avoid uncontrolled release of the gas into an enclosed space. • If you suspect the release of an asphyxiant you should vacate the space and call the EHS office so field measuring devices can be used to determine the oxygen content of the space atmosphere.

PHYSICAL HAZARDS

EXPLOSIVES

Description:	If a chemical has been determined to represent an explosion hazard that means severe bodily damage, burns, trauma, or death could result should an explosion occur. Explosives are divided into many hazard categories, each with a different degree of explosion threat. The most serious are those chemicals categorized unstable explosives to those that would only represent an explosion hazard if they are subject to fire or interaction with other chemicals.						
Criteria for Hazard Categorization:	Based on Physical Properties Test Data						
Severity Scale:	Most Severe						Less Severe
Hazard Categories:	Unstable	Div 1.1	Div 1.2	Div 1.3	Div 1.4	Div 1.5	Div 1.6
Signal Words:	Danger	Danger	Danger	Danger	Warning	Danger	None
Hazard Statements:	Unstable explosive	Mass explosion hazard	Severe projection hazard	Fire, blast, or projection	Fire or projection hazard	May mass explode in fire	None
Pictogram(s):						None	
Campus Users:	The campus does not have or use any unstable explosives or explosives in hazard categories Div 1.1 through 1.3. There are some chemicals and products in Div 1.4 through Div 1.6 used by UPD and the sciences. These include small arms ammunition and ammonium nitrate.						
Precautionary Statements and Safe Use Guidelines:	• Keep explosives away from heat, sparks, open flames, and hot surfaces. • Ground and bond containers and receiving equipment if the chemical is electrostatically sensitive. • Do not subject to grinding, shock, or friction. • In case of fire, evacuate the area.						

SELF-REACTIVE SUBSTANCES AND MIXTURES

Description:	If a chemical has been determined to be self that means it could explode or ignite if heated potentially resulting in burns, severe bodily damage, trauma, or death. There are several categories of self-reactives all based on the temperature at which they are stable and the severity of self-reaction if subject to heat.					
Criteria for Hazard Categorization:	Based on Physical Properties Test Data					
Severity Scale:	Most Severe					Less Severe
Hazard Categories:	Type A	Type B	Type C	Type D	Type E	Type F
Signal Words:	Danger	Danger	Danger	Danger	Warning	Warning
Hazard Statements:	Heating May Cause Explosion	Heating May Cause Fire or Explosion	Heating May Cause Fire			
Pictogram(s):						
Campus Users:	No chemicals are used on campus that are specifically classified as self-reactives.					
Precautionary Statements and Safe Use Guidelines:	• Self-reactives must be kept cold or cool at a temperature specified by the manufacturer. • Keep away from heat, sparks, open flame or hot surfaces. • Always keep self-reactives in their original container • Always store away from combustible materials					

PHYSICAL HAZARDS

FLAMMABLES				
Description:	If a chemical has been determined to be flammable that means it could ignite potentially resulting in burns or severe bodily damage. There are several classes of flammables all based on their physical state (gases, aerosols, liquids, and solids). Flammability categories are based on the ability of the chemical to ignite.			
Criteria for Hazard Categorization:	All Based on Physical Properties Test Data			
Physical State	Flammable Gases			
Severity Scale:	Most Severe		Less Severe	
Hazard Categories:	1		2	
Signal Words:	Danger		Warning	
Hazard Statements:	Extremely Flammable Gas		Flammable Gas	
Pictogram(s):			None	
Physical State	Flammable Aerosols			
Hazard Categories:	1		2	
Signal Words:	Danger		Warning	
Hazard Statements:	Extremely Flammable Aerosol		Flammable Aerosol	
Pictogram(s):				
Physical State	Flammable Liquids			
Hazard Categories:	1	2	3	4
Signal Words:	Danger	Danger	Warning	Warning
Hazard Statements:	Extremely Flammable Liquid and Vapor	Highly Flammable Liquid and Vapor	Flammable Liquid and Vapor	Combustible Liquid
Pictogram(s):				None
Physical State	Flammable Solids			
Hazard Categories:	1		2	
Signal Words:	Danger		Warning	
Hazard Statements:	Flammable Solid		Flammable Solid	
Pictogram(s):				
Campus Users:	The campus has many flammable gases, liquids and aerosols used by multiple departments. The most common include fuels, solvents, cleaners, and spray products that contain flammable carrier gases.			
Precautionary Statements and Safe Use Guidelines:	• Flammables should be kept away from heat, sparks, and open flames. • Use non-sparking tools. • Keep containers tightly closed. • Ground and bond containers and receiving equipment if the chemical is electrostatically sensitive or has such volatility to generate a hazardous atmosphere. • Use intrinsically safe electric tools, lighting, & ventilating equipment to prevent ignition • Take precautionary measures against static discharge (always fill fuel cans on the ground)			

PHYSICAL HAZARDS

PYROPHORIC LIQUIDS, SOLIDS, AND GASES	
Description:	If a chemical is pyrophoric that means it could catch fire if exposed to **air** will burn potentially causing an explosion or fire resulting in burns, severe bodily damage, trauma, or death.
Criteria for Hazard Categorization:	Based on Physical Properties Test Data
Hazard Categories:	1
Signal Words:	Danger
Hazard Statements:	Catches Fire Spontaneously if Exposed to Air
Pictogram(s):	
Campus Users:	The campus does not have any procured chemicals that are classified as pyrophoric. Chemistry uses diethyl ether that can develop pyrophoric organic peroxides as the chemical ages or is exposed to air. The department periodically checks these chemicals to confirm that peroxides are not present.
Precautionary Statements and Safe Use Guidelines:	Keep away from heat, sparks, open flame or hot surfaces. Do not allow contact with air. Wear protective gloves, eye and face protection. In the event of skin contact immerse in cool water and wrap with wet bandages

SELF-HEATING SUBSTANCES AND MIXTURES		
Description:	If a chemical is self-heating that means it could catch fire if exposed to heat potentially causing burns, severe bodily damage, trauma, or death.	
Criteria for Hazard Categorization:	Based on Physical Properties Test Data	
Severity Scale:	Most Severe	Less Severe
Hazard Categories:	1	2
Signal Words:	Danger	Warning
Hazard Statements:	Self-heating – May Catch Fire	Self-heating in large quantities – May catch fire
Pictogram(s):		
Campus Users:	No specific self-heating substances or mixtures are procured by the campus. There are, however, several substances used by the sciences that will react upon contact with water might ignite and release flammable gases. These are included under substances and mixtures that, when in contact with water, emit flammable gases.	
Precautionary Statements and Safe Use Guidelines:	• Keep substance cool and protect from sunlight. Some self-heating substances may require refrigeration. • Wear protective gloves, eye and face protection. • Store away from other materials	

PHYSICAL HAZARDS

SUBSTANCES AND MIXTURES, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

Description:	These substances and mixtures are considered water reactive and, when in contact with water, could ignite, release flammable or toxic gases potentially causing burns and respiratory hazards.		
Criteria for Hazard Categorization:	Based on Physical Properties Test Data		
Severity Scale:	Most Severe		Less Severe
Hazard Categories:	1	2	3
Signal Words:	Danger	Danger	Warning
Hazard Statements:	In contact with water releases flammable gases, which may ignite spontaneously	In contact with water releases flammable gas	In contact with water releases flammable gas
Pictogram(s):			
Campus Users:	The science departments are the only campus groups who use water reactive substances. These include sodium metal (in dry oil), magnesium ribbon, calcium hydride, calcium ingot, and n-butyllithium (in hexane).		
Precautionary Statements and Safe Use Guidelines:	• Do not allow contact with water. • Handle under inert gas • Protect from moisture and store in a dry place. • Keep in its original container and keep the container closed. Many of these substances are intended to be stored in a specific liquid. • Wear protective gloves, eye and face protection		

ORGANIC PEROXIDES

Description:	If a chemical classified as an organic peroxide that means it could cause a fire or explosion if subject to heat or shock potentially resulting in burns, severe bodily damage, or death. Organic peroxides can be in liquid or solid form and will release gases during decomposition.					
Criteria for Hazard Categorization:	Based on Physical Properties Test Data					
Severity Scale:	Most Severe					Less Severe
Hazard Categories:	Type A	Type B	Type C	Type D	Type E	Type F
Signal Words:	Danger	Danger	Danger	Danger	Warning	Warning
Hazard Statements:	Heating may cause an explosion	Heating may cause an explosion	Heating may cause fire			
Pictogram(s):		 				
Campus Users:	Very few organic peroxides are used by campus groups and only the chemistry department has an organic peroxide in the chemical inventory. This chemical, benzoyl peroxide, is a Type C organic peroxide.					
Precautionary Statements and Safe Use Guidelines:	• Keep away from heat, sparks, open flames, or any ignition source. • Keep and store organic peroxides away from clothing and other combustible materials. • Store in original container. • Do not store in sunlight. • Do not store with other materials. • Wear protective gloves, eyes, and face protection					

PHYSICAL HAZARDS

OXIDIZERS (GASES, LIQUIDS, SOLIDS)			
Description:	If a chemical has been determined to be an oxidizer that means it could cause a fire, explode, or intensify a fire potentially resulting in burns, severe bodily damage, or death. There are several classes of oxidizers all based on their physical state (gases, liquids, and solids).		
Criteria for Hazard Categorization:	All Based on Physical Properties Test Data		
Physical State	Oxidizing Gas		
Hazard Categories:	1		
Signal Words:	Danger		
Hazard Statements:	May Cause or Intensify a Fire		
Pictogram(s):			
Physical State	Oxidizing Liquid		
Severity Scale:	Most Severe		Less Severe
Hazard Categories:	1	2	3
Signal Words:	Danger	Danger	Warning
Hazard Statements:	May cause fire or explosion Strong Oxidizer	May intensify fire	May intensify fire
Pictogram(s):			
Physical State	Oxidizing Solid		
Hazard Categories:	1	2	3
Signal Words:	Danger	Danger	Warning
Hazard Statements:	May cause fire or explosion Strong Oxidizer	May intensify fire	May intensify fire
Pictogram(s):			
Campus Users:	Oxidizers are used by many campus departments including custodial, pool maintenance staff, and the sciences. Some of the more common oxidizers on campus are in solid or liquid form and include calcium hypochlorite used for pool disinfection, halogens (chlorine, bromine, iodine), nitric acid, hydrogen peroxide (30%), zinc and barium peroxide, and various potassium compounds (nitrate, bromate, perchlorate, permanganate, and dichromate).		
Precautionary Statements and Safe Use Guidelines:	• Keep and store oxidizers away from clothing and other combustible materials. • Do not store oxidizers with flammable chemicals. • Keep oxidizers away from heat. • For oxidizing gases keep valves and fittings free of oil and grease and store in a well-ventilated location • For oxidizing liquids and solids follow safety precautions and avoid mixing with combustibles or incompatible materials • For oxidizing liquids and solids wear protective gloves and goggles. Recommendations may include wearing fire/flame resistant or retardant clothing.		

PHYSICAL HAZARDS

CORROSIVE TO METALS

Description:	If a chemical has been determined to be corrosive to metals that means contact of these chemicals to metals can cause corrosion.
Criteria for Hazard Categorization:	Based on Physical Properties Test Data
Hazard Categories:	1
Signal Words:	Warning
Hazard Statements:	May be Corrosive to Metals
Pictogram(s):	
Campus Users:	Many campus groups use chemicals that are corrosive to metals. Most of these will be the same chemicals that pose a skin corrosion hazard and will include strong acids or bases in the low or high ends of the pH scale. Additional metal corrosive chemicals used by campus groups include hydrogen peroxide, sodium hydroxide, bromine and ammonia.
Precautionary Statements and Safe Use Guidelines:	• Keep and store in original container. • These chemicals may also be corrosive to the skin and eyes and precautions should be taken to protect skin and eyes by wearing appropriate personal protective equipment in the form of gloves, goggles, and body protection as necessary. • If you get a corrosive or irritating chemical on your skin promptly rinse the contact area with water. For eye contact use an eyewash. • Chemicals that are corrosive should never be consumed. • Many corrosives can emit hazardous fumes and should only be used in fume hood or in a well-ventilated area. The safety data sheet will indicate proper usage in the precautionary statements. • All users of corrosives should practice good hygiene procedures both during and after use by not eating or drinking when using the chemical and washing hands after handling. • Strong acids and bases should always be stored in secure chemical storage cabinets.

GASES UNDER PRESSURE

Description:	Gases under pressure means that there is a potential of explosion or projectile hazard should the cylinder rupture (projectile hazard) or be subject to heat or fire (explosion) resulting in severe bodily damage, or death. Additional hazards could also be present including cryogenic burns (freeze), asphyxiation, or inhalation exposure (if the cylinder contains hazardous gas).			
Criteria for Hazard Categorization:	Based on Physical Properties Test Data			
Hazard Categories:	Compressed	Liquified	Dissolved	Refrigerated Liquified
Signal Words:	Warning	Warning	Warning	Warning
Hazard Statements:	Contains gas under pressure – May explode if heated			Contains refrigerated gas May cause cryogenic burns or injury
Pictogram(s):				
Campus Users:	Several campus groups use gas cylinders under pressure containing a variety of chemicals, compounds, and fuels. These groups include the sciences (instrument gases, cryogenics), motor pool (cutting torch gases), fabrication shop (welding gases), ice arena (propane tanks for Zamboni), outdoor pursuits (camp propane fuel), HVAC (refrigerants, propane), food service (beverage dispenser CO_2 cylinders). Other items include some aerosol cans, compressors and fire extinguishers.			
Precautionary Statements and Safe Use Guidelines:	• Always store compressed gas cylinders securely (chain or strap to wall) and make sure cap is in place when not in use. • When transporting large gas cylinders always use a cylinder hand truck or dolly. • Never expose a gas cylinder to heat or flame and never purposely rupture a pressurized gas cylinder. • Cylinders containing flammables must be stored in flammable cabinets indoors and in secure racks if outdoors. • Always protect eyes and skin when using cryogenics (liquid nitrogen, etc.) to prevent freeze or burns.			

10. PREVENTING AND CONTROLLING EXPOSURE

A critical component of an effective hazard communication program is to make sure users of hazardous chemicals know how to prevent or control their exposure to the chemicals they are using.

This section expands on the safe use guidelines provided for each hazard classification in the previous section.

Related Programs

The university has separate programs that cover all forms of personal protective equipment and engineering controls. These can be found on the EHS website under the programs, polices, and procedures link and include:

- Personal Protective Equipment Program
- Respiratory Protection Program
- Chemical Hygiene Plan
- Waste Management Program

It is not the intent of this section to duplicate all of the information contained in the forementioned programs but to reinforce the need to use chemicals according to the manufacturers' safety recommendations and use personal protective equipment and engineering controls under circumstances when they are indicated to protect users from exposure.

Methods for Controlling Exposure

When evaluating the measures that need to be taken to prevent and control exposure one must determine the overall toxicity of the chemical and the route of entry into the body. A chemical may only pose a severe toxic effect if ingested or inhaled while posing little to no threat of physical hazard.

The three primary means of preventing and controlling exposure to a hazardous chemical are through the use and employment of:

1. Personal Protective Equipment (PPE)
2. Engineering Controls
3. Following Safe Use Guidelines Listed in this Program and Safety Data Sheets

Personal Protective Equipment (PPE)

The most common forms of chemical protective PPE will be those designed to protect the skin, eyes, and respiratory system. These include various types of gloves to protect the hands, face shields to protect the face, goggles to protect the eyes, suits, smocks and aprons to protect the body, and respirators to protect the lungs. All forms of PPE are available to users of hazardous chemicals. Employees are encouraged to contact the EHS office any time there is a question or concern about the proper PPE that should be worn when using hazardous chemicals.

How do you know what PPE to wear?

Section 8 of the safety data sheet will provide this information under individual protection measures. Users should follow the PPE recommendations indicated on the safety data sheet for the chemical they are using and wear the recommended PPE when using that chemical.

Engineering Controls

The most common forms of engineering controls at the university include local exhaust ventilation in the form of hoods (fume, side draft, canopy), paint booths, glove boxes, and snorkel hoods. The majority of these are located in Bowers Hall in the Chemistry, Biology, and Geology departments. Dowd Fine Arts, Old

Main, Professional Studies and the Hazardous Waste building also contain a variety of hoods and booths for operations in the arts, kinesiology, maintenance, and EHS departments.

How do you know if I should be using the chemical in a fume hood or booth?

The safety data sheet will provide this information under precautionary measures (Section 2) and appropriate engineering controls (Section 8). If a safety data sheet indicates the chemical should only be used within a fume hood or local exhaust ventilation that means the chemical is likely highly toxic and the only effective way to prevent and control exposure is by using that chemical in a fume hood or booth. Users should follow the engineering controls recommendations indicated on the safety data sheet for the chemical they are using.

What if the safety data sheet doesn't specify that the chemical should be used in a fume hood but says to "Use in a well-ventilated area"?

This is one of the most common safe use statements that appear on almost all safety data sheets for chemicals that emit vapors, fumes, mists, and dusts. Many of these chemicals are common cleaning and disinfection products used by custodial staff. Users need to recognize that the chemical may represent an inhalation hazard and precautions should be taken to make sure the area where the chemical is being used has adequate ventilation. Simple steps to reduce exposure include:

- Open a window or door
- Make sure the room exhaust fan is operating (e.g. bathrooms, slop sink rooms)
- Use a portable fan to exhaust the space air out of a window
- Where possible perform the task outdoors
- Wear respiratory protection (respirator, dust mask)

<u>Manufacturers Safe Use Guidelines</u>

Beyond PPE and engineering controls, information on safe usage can be found throughout a safety data sheet or container label and can include recommendations for proper hygiene measures, safe handling and storage, conditions to avoid, the reactivity of the chemical, and other general safe usage statements.

11. LABELING

Labeling is extremely important, and unlabeled bottles and containers can result in injury, exposure, and costly disposal of wastes of unknown content.

This section will provide users of chemicals information on container labels as received from the manufacturer or supplier as well as secondary container labeling rules.

Containers with Manufacturer Labels:

- Containers that have the original manufacturers label do not need any other labeling so long as the label is legible and intact.
- If at any time a label becomes detached, missing, damaged, or illegible you must either reattach the label or treat that container as a secondary container and provide a replacement label.

Secondary Containers:

A secondary container is any container to which a chemical or substance is transferred from its original container. The secondary container labeling rules below apply to all campus departments that use hazardous chemicals. Even if a chemical or substance is not hazardous, the secondary container rules still apply.

Remember, if you put a substance into a secondary container and do not label it then you are the only one who knows exactly what is in that container.

Secondary Container Labeling Rules

1. All secondary containers, where the intent is to place that container in storage for reuse at a later time, must be labeled with a label approved by the EHS office.
2. This label must have the product identifier (name) clearly and legibly written on the label along with hazard statements including signal words, GHS pictograms, and any other hazard statements or hazard identifiers.

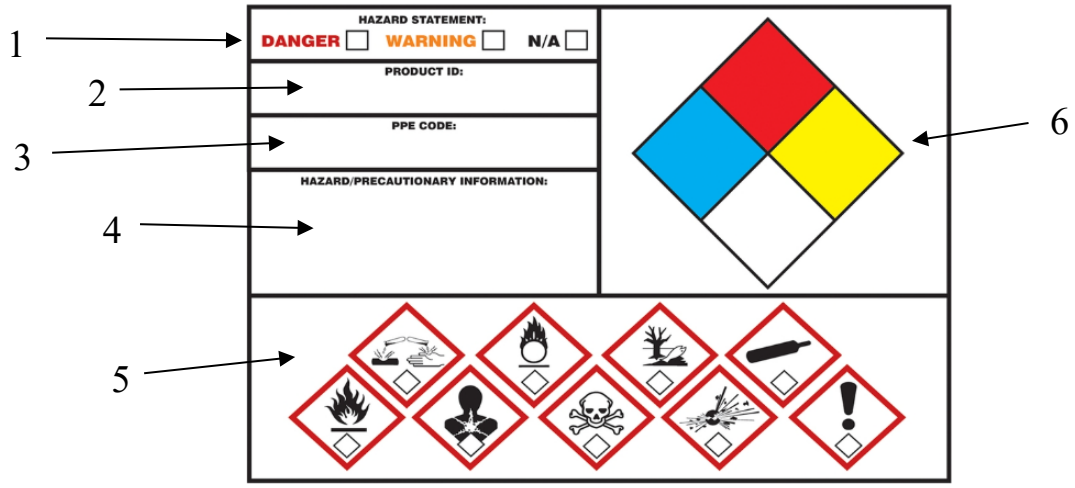
The exceptions to the secondary container labeling rules are any container where:

- The contents will be for single usage and will be under direct control of the user, not left unattended, and not used by another individual.
- The container (still containing contents) will not be put into storage
- The secondary container is too small to accept a typical secondary label. In this case you should, at a minimum, write the name of the chemical directly on the container or attach a tag with the name of the chemical.
- The container is a built-in component of a piece of machinery, tool, or vehicle designed hold a specific fuel, oil, or fluid. These will usually have the required contents already marked on the lid, cap, or fill location.

Common examples of single usage containers are custodial mop buckets, tanks used for irrigation and fertilization by the grounds department, paint roller pans, and various glassware used by the sciences during experiments.

Common examples of continued use of secondary containers are fuel storage tanks (gasoline, diesel, fuel oil, propane), any type of container use to transfer or transport a chemical from one location to another, custodial spray bottles containing cleaning and disinfection agents, waste drums and containers, and chemicals used in scientific experiments.

The information below is a guide for completing a typical secondary bottle label.



Each section of the secondary label is described below:

1. Hazard Statement – If the product or chemical has a hazard statement (danger or warning) listed on the safety data sheet or original product label then the appropriate box should be checked. If there is no hazard warning, then the N/A (not applicable) box should be checked.
2. Product ID - You must write the name of the product or chemical in this box
3. PPE (personal protective equipment) Code - We do not currently mandate that this be marked on the label and can be filled in at the discretion of the individual completing the label. The index of PPE codes is shown below:

A: Safety Glasses	G: Safety Glasses, Gloves, and Vapor Respirator
B: Safety Glasses and Gloves	H: Splash Goggles, Gloves, Apron, and Vapor Respirator
C: Safety Glasses, Gloves and Apron	I: Safety Glasses, Gloves, and a Dust and Vapor Respirator
D: Face Shield, Gloves, and Apron	J: Safety Goggles, Gloves, Apron, and a Dust and Vapor Respirator
E: Safety Glasses, Gloves, and Dust Respirator	K: Airline Hood or Mask, Gloves, Full Suit, and Boots
F: Safety Glasses, Gloves, Apron, and Dust Respirator	X: Consult with EHS office or Supervisor for Special Direction

4. Hazard Precautionary Information – This section should be kept simple and focus on the primary precautions listed on the safety data sheet
5. GHS Pictograms - If the safety data sheet or original product label shows pictogram(s) then those pictogram(s) must be checked on the secondary label.
6. National Fire Protection Association (NFPA) Diamond – This information may be difficult to find on a safety data sheet. If available, it will typically be in Section 16. The diamond consists of 4 color coded categories each depicting a hazard posed by that chemical:
   - Blue = Health Hazard (0-4)
   - Red = Flammability or Fire Hazard (0-4)
   - Yellow = Reactivity or Instability (0-4)
   - White = Specific Hazard (acid, alkaline, corrosive, oxidizer, radioactive, etc.)

   The NFPA diamond is a numerical based system with 0 posing little to no risk and 4 posing the greatest risk for that hazard category. Those completing labels simply need to write the numeral in each corresponding blue, red, or yellow diamond and the specific hazard in the white diamond.

Obtaining Secondary Labels

Secondary labels can be obtained by contacting the EHS office. In addition, instructional support technicians in the sciences departments, and supervisors of the various facilities operations services departments will have a stock of secondary bottle labels for use.

Tips for filling out secondary bottle labels

- Use a permanent marker
- Complete the label before fixing to the container
- Write legibly so others can read the words on the label

It is important that secondary container labels are not too complicated. Remember, the most important aspects of the label are to identify the product and alert the user of general hazard information.

12. TRAINING AND RECORDKEEPING

TRAINING

Training is an important component of a successful Hazard Communication and "Right-to-Know" program. SUNY Cortland provides this training as follows:

- Initial Hazard Communication and "Right to "Know" training for New Employees
- Annual Refresher Training

The extent of training provided depends on the job description and use of hazardous chemicals by the employee.

Informational Training Requirements for All New Employees

All new employees, whether their job description requires them to use hazardous chemicals or not, receive the following informational training from the Human Resources office as part of the on-boarding process:

- Introductory video on Biz Library titled: "Right to Know: Federal and New York Standards"
- Environmental Health and Safety document on Biz Library titled "Hazard Communication and Right to Know". This downloadable pdf document can be saved or printed by the employee.

The video provides a basic overview of the Hazard Communication and "Right to Know" laws. The Environmental Health and Safety document provides information specific to SUNY Cortland on chemical inventory, safety data sheet access and overview, GHS pictograms, bottle labeling requirements, and general safe use and handling guidelines of chemicals. The purpose of this training is to ensure all SUNY Cortland employees are aware of these laws and some of the resources and information available to them regarding hazardous chemicals. If the employee's job description or duties include the use or handling of hazardous chemicals, then additional training is provided as outlined below.

Formal Training Requirements for New Employees who use Hazardous Chemicals

The EHS office maintains a chemical database and has an inventory of hazardous chemicals used by various campus departments. Employees who work in these departments that use or handle hazardous chemicals are provided formal training as follows:

Facilities Operations Services (FOS) Staff

The EHS office is responsible to provide formal Hazard Communication and "Right to Know" training for all staff working in Facilities Operations and Services (FOS) who use or handle hazardous chemicals. These include:

- Custodial
- Grounds
- General Maintenance
- Skilled Trades (plumbers, electricians, fabrication, HVAC, carpenters, masons, painters)
- Warehouse
- Motor Vehicle Maintenance and Transportation

EHS is notified of new employee hires by the department leader or supervisor and the training is scheduled as soon as possible after the employee starts work. This typically occurs on the first day of employment before they start performing work-related tasks involving hazardous chemical use. This training is in-person with an EHS staff member. This training covers many safety-related topics specific to the employees work duties including Hazard Communication and "Right-to-Know". Topics covered specific to Hazard Communication and "Right to Know" include:

- The campus Hazard Communication and "Right to Know" program (how to access the program
- Chemical management database (how to access and navigate)
- Safety Data Sheets (Access, Review of SDS sections, and department specific SDS example review)
- Review of the GHS pictograms (Review of the Health and Physical Hazards)
- Labeling (Secondary container labeling rules and obtaining labels)
- Department Hazard Assessment (includes chemical)
- Toxicology review including Acute vs Chronic Exposures
- Exposure Prevention (Personal Protective Equipment, Engineering Controls, Safe Work Practices)

The training is presented via a Power Point presentation developed specifically for each department and include handouts for the employee to reference.

Other Campus Departments

New employee training for other campus departments that use hazardous chemicals is provided by either EHS or that department. Training by the EHS office will occur only if EHS is notified of a new hire and a request is made by that department for EHS to provide the training. If neither the notification or request is made to EHS it will be the responsibility of that department to conduct their own Hazard Communication and "Right-to-Know" training. The list below includes departments where the above statements regarding new employee training apply:

- Sciences (biology, chemistry, geology)
- Arts (painting, drawing, ceramics, lithography, printing, photography, sculpture, foundry, fibers, performing arts production)
- University Police Department
- Athletics (athletic training, equipment room, ice arena)
- Child Care Center
- Campus Technology
- Duplicating Center
- Student Health Services
- Student EMS
- Professional Studies
- Psychology (Moffett vivarium operations)
- Outdoor Pursuits & Education, Recreation Sports, Recreation Parks and Leisure

- Brauer Field Station and Raquette Lake Maintenance and Custodial Staff

department s made along with a request for this training by that department.

Annual Refresher Training

EHS provides annual Hazard Communication and "Right to Know" refresher training for all Facilities Operations and Services staff. The refresher training style varies by year and can include in person training or prepared handouts (with sign-in sheet) distributed to each supervisor for distribution to their staff to read and sign. The sign in sheets are returned to the EHS office to be entered into recordkeeping.

Each year the EHS office sends out correspondence to other department heads or leaders offering to proctor refresher training for their staff. Those that do respond and request the training receive training specific to their operation and usage of hazardous chemicals. If no request for training is received by EHS then it is assumed the department will conduct the refresher training.

RECORDKEEPING

Records of Hazard Communication "Right-to-Know" training are maintained by both Human Resources and the EHS office. Human Recourses maintains records for the Hazard Communication/Right-to-Know Biz Library video and the Hazard Communication document. The EHS office maintains records for those who have gone through in-person or tool-box talk training proctored by EHS staff. These trainings include initial training, refresher training, and tool-box talks. For each training a sign in sheet is filed in EHS records along with a copy of the training agenda. This information is also entered into a historical training spreadsheet.

13. SPILLS AND ACCIDENTS

Detailed information on addressing campus chemical spills is provided in the campus Spill Response Program.

The purpose of this section is to focus on exposure prevention and procedures to follow in the event of an uncontrolled release of a hazardous chemical.

Spills and accidents can occur, sometimes at no fault of the chemical user. Adverse events such as equipment failure, container rupture, and general mishaps can all lead to a spill or accident involving the uncontrolled release of a hazardous chemical. This can result in skin or eye contact with the chemical, inhalation of toxic gases, fumes, or vapors, and unintentional ingestion or injection of the chemical.

The worst-case scenarios related to exposure as a result of a spill or accident would be:

- Inhalation of toxic gases, vapors, or fumes from a hazardous chemical that is spilled or released inside a building. The most common of these will be organic solvents, aromatic hydrocarbons, fuels, highly concentrated acids and bases, and cleaning and disinfection products containing chlorine or ammonia.
- Gross skin or eye contact by a chemical posing an absorption, skin or eye contact hazard.
- Unintentional ingestion or injection of a hazardous chemical.
- Uncontrolled release of a highly flammable chemical resulting in either fire or explosive atmosphere

Spills of chemicals outdoors can also pose these hazards and can also lead to contamination of both land and waters.

In the event of a spill or accident involving a chemical the following sections of the safety data sheet will provide guidance on addressing both exposure and clean-up:

- Section 4: First Aid Measures

- Section 6: Accidental Release Measures

Additional information for each of these SDS sections can be found in Safety Data Sheet Users Guide located in Section 7 of this program.

Below are procedural guidelines to be followed for specific spill or accident events.

PROCEDURES FOR SPILLS AND ACCIDENTS

All spills and accidents of chemicals should be reported to the EHS office regardless of the hazardous nature of the chemical. The following as case specific procedures that should be followed.

Uncontrolled spills or releases of hazardous chemicals inside a building that are emitting vapors, fumes, or odors:

- If the spill or release occurs inside a single space or room with closeable doors then vacate the space and close the door(s) to the space/room where the spill occurred. If possible open windows in the effected space before vacating.
- If the spill occurs during working hours call EHS at X2508 and provide the building, space number or location, and name of the chemical. EHS will take action or provide guidance on actions that need to be taken. This may include initiation of building evacuation, communication with the building management system (BMS) operator to make necessary adjustments to the ventilation system, or physical response by EHS staff
- If such a spill occurs in a common area (hallway, stairwell, etc,) or the odors have already spread to other areas of the building, the building will need to be evacuated. In this case you should activate a pull station and call UPD at 911.
- Actions will be taken by the emergency responders to evaluate and remediate the situation.
- You should not return to the affected space or building until formal clearance for re-occupancy has been made by either EHS or emergency responders.
- If you suspect you were exposed, or are experiencing health related symptoms, you should seek medical attention by either the responders (EMT) or visit a physician.

Accidents that involve gross skin or eye contact by the spilled hazardous chemical

- Immediately seek an emergency shower, shower, sink, or hose and take off any clothing that was soaked with the chemical. Rinse the area of the body/skin where the contact occurred with water
- If the chemical is into the eyes, seek an eyewash station. If an eyewash station is not readily available find a sink or other water source and douse the eyes with water.
- If the exposure is causing extreme pain, discomfort, rash, burning, eye issues then call 911.
- Afterwards seek medical attention and report the accident (complete WC-1 form).

Accidents that involve accidental or unintentional ingestion or injection of a hazardous chemical

- Call 911 immediately and report the name of the chemical. First aid directions will be provided and, if necessary, emergency responders will be dispatched or you will be directed to seek medical attention.
- When you are capable, report the accident (complete WC-1 form).

Chemicals spills outdoors (earthen land, roads, concrete, asphalt) or into waterways or storm drains

- Contact the EHS office immediately. EHS has equipment to the If you cannot reach the EHS office contact UPD X2111.
- Avoid physical contact with the chemical.
- If the chemical is releasing odors, fumes or vapors keep a safe distance (preferably upwind).

14. CHEMICAL WASTE HANDLING, STORAGE AND DISPOSAL

Suny Cortland has a separate Waste Management Program that provides rules and regulations on the disposal of many categories of waste.

There are many types and categories of waste including solid, sanitary, construction and demolition debris, recyclables, universal, non-hazardous commercial and industrial, hazardous, and regulated medical.

The purpose of this section is to inform employees that some wastes generated by the campus may contain chemicals and substances that may pose a health or physical hazard to those who are involved in the collection, handling, storage, and disposal.

Wastes categorized as "Hazardous" pose the greatest potential of containing hazardous chemicals based on flammability, corrosivity, reactivity or toxicity of the chemical. Wastes categorized as "Universal Waste" can contain hazardous chemicals. In both cases these can represent health or physical hazards.

Only select groups and personnel are authorized to collect, handle, store, and dispose of campus hazardous and universal wastes. These include:

- Hazardous Waste: Faculty and staff of the science and art departments and the EHS staff
- Universal Waste: Facilities Operation Services (custodial, trades, motor pool, grounds) and EHS staff.

Hazardous wastes are those that contain a chemicals that pose a known threat to human health or the environment due to the toxicity, reactivity, ignitability, or corrosivity of chemical or chemical composition. Those involved in the collection, handling, storage, and disposal of hazardous wastes must employ the same safe use guidelines as the raw or stock chemical or chemicals from which they originated.

Universal wastes can contain hazardous chemicals or substances. Under normal conditions there is very little threat of exposure due to the fact that the chemical or substance is self-contained in the product or piece of equipment. Examples are aerosol, cans still containing product, light ballasts, lamp bulbs, mercury containing devices, expired pesticides in their original container. Provided these devices and containers are not leaking, broken, or punctured they can be handled and stored for disposal.

Some universal wastes can contain hazardous chemicals and substances. Examples include:

- Batteries: can contain corrosive acids and heavy metals.
- Aerosol cans and paints: can contain a variety of chemicals that can pose both health and physical hazards.
- Lamps, thermostats, and switches: can contain mercury in vapor, powder or liquid form.
- Light ballasts: can contain PCBs.
- Mercury containing devices: can contain liquid mercury.
- Spent pesticides: can contain chemicals that can pose health hazards.

If a wastes contains unknown chemical content the EHS office should be contacted for guidance so the waste can be evaluated, categorized, tested, and disposed of properly.

Those involved in the handling, storage and disposal of chemical wastes wherein the contents are known should reference the following sections of the safety data sheet for guidance:

- Section7: Handling and Storage
- Section 10: Stability and Reactivity
- Section 13: Disposal Considerations

Additional information for each of these SDS sections can be found in Safety Data Sheet Users Guide located in Section 7 of this program.

Below are additional guidelines that should be followed to prevent exposure, adverse events, or release of wastes to the environment:

- Always consult with the EHS office if you are unsure how to handle, store, or dispose a waste.
- Never flush a waste down into the sanitary sewer unless you are sure it is not a hazardous waste. Remember, all sinks, toilets, slop sinks, and building interior floor drains go to the sanitary sewer.
- Never dump or discharge anything but clean water into a storm sewer.
- Never intentionally break or puncture a light bulb, light ballast, battery, paint can, aerosol can, or mercury containing device. If one is accidentally broken or leaking contact the EHS office for guidance.
- Never intentionally mix chemical wastes unless you confirm with EHS first. Improper mixing of chemical waste could result in an adverse reaction between the incompatible chemicals. In addition, the mixing of chemical wastes can result in recategorize that entire mixed waste as hazardous and drastically increase the cost of disposal.
- All chemical wastes should be properly contained and stored in either satellite or central storage areas or in universal waste storage areas.
- All wastes need to be labeled with the contents and composition.

15. APPENDIX A

ACGIH: Is the American Conference of Governmental Industrial Hygienists, a non-regulatory organization, that establishes exposure limits called Threshold Limit Values (TLV's).

Acid: A chemical with a pH less than 7. Weak acids are typically in the 4-6 range while strong acids will be in the 0-3 range. Strong acids are very corrosive and pose a serious risk for physical and health damage by both contact and inhalation of fumes.

Acute Exposure: Short term exposure that caused immediate adverse effects.

Absorption: The penetration of a chemical or substance thought the skin or eyes.

Alkaline: The same as a base – see definition of base.

Aspiration Hazard: Aspiration means the entry of a liquid or solid chemical directly through the oral or nasal cavity, or indirectly from vomiting, into the trachea (windpipe) and lower respiratory system. This can result in severe effects such as chemical pneumonia (lung inflammation with breathing difficulty), pulmonary (lung) injury or death following aspiration.

Base: A chemical with a pH greater than 7. Weak bases are typically in the 8-10 range while strong bases will be in the 11-14 range. Strong bases are very corrosive and pose a serious risk for physical and health damage by both contact and inhalation of fumes.

Carcinogen: A chemical that is capable of causing cancer.

CAS: Chemical Abstract Service registry number.

Chemical: Any substance that has a defined composition.

Chemical Abstract Services (CAS): Is a registry number for a chemical that is unique and specific to that chemical regardless of how many other ways the chemical is described.

Chemical Compound: A mixture of 2 or more chemicals in a fixed ratio.

Chemical Mixture: Two or more chemical that can be combined without reacting with each other.

Chronic Exposure: Repeated exposure to small amounts of a chemical that result in adverse effects after long period of time.

Corrosive: A chemical that causes visible destruction of, or irreversible alterations in living tissue by chemical action at the site of contact. Common corrosive chemicals are the strong acids and bases with pH values less than 3 and greater than 10.

Dermal Exposure: Contact with the chemical to the skin.

Dose: The amount of a chemical that a person is exposed to during an event or period of time.

Exposure Limits: Are limits of airborne chemicals established by federal OSHA regulations that cannot be exceeded during the course of a work day or other specified period of time. These include permissible exposure limits (PEL's), short term exposure limits (STEL) and ceiling limits (C). Other non-regulatory agencies also have established exposure limits including NIOSH and the ACGIH. Exposure limits vary by chemical and are determined through toxicological studies.

Flammable: Are chemicals, in either gas, liquid, or solid state, that will ignite and continue to burn in air if exposed to a source of ignition.

GHS: Globally Harmonized System is a United Nations adopted system of classifying and labeling chemicals. This system was formally adopted by OSHA in 2015.

GHS Pictograms: A series of nine (9) symbols depicting the hazards associated with a particular chemical. See section of this program for details.

Hazardous Chemicals: Those chemicals that pose a physical or health hazard.

Hazardous Waste: As defined by Federal RCRA regulations, hazardous wastes are those that meet the criteria to be defined as such based on flammability, corrosivity, reactivity and toxicity.

Health Hazard: A chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, mutagens, hepatotoxins, nephrotoxins, neurotoxins, asphyxiants, aspiration, and agents which act on the hematopoietic system and agents which damage the lungs, skin, eyes, or mucous membranes.

IARC: International Agency for Research on Cancer.

IDLH: Immediately Dangerous to Life and Health.

Ingestion Exposure: Eating or drinking a chemical.

Inhalation Exposure: Breathing in chemical vapors, fumes or particulate.

Injection Exposure: Chemical entering directly into the blood steam via needle stick, sharp, or open wound.

Irritant: A chemical that causes inflammation or irritation to a body surface, including eyes, respiratory tract, skin or mucous membranes, upon contact.

Latency Period: The period of time it takes for a disease to manifest after the initial exposure.

LC50: Is an estimated concentration of a chemical via inhalation exposure that will result in the fatality of 50% of a population exposed to that concentration.

LD50: Is an estimated concentration of a chemical via ingestion or dermal exposure that will result in the fatality of 50% of a population exposed to that concentration.

Mutagen: A chemical that causes a genetic mutation.

NIOSH: Is the National Institute of Occupational Safety and Health, a federal organization, that performs toxicological research and establishes exposure limits called Recommended Exposure Limits (REL's).

Personal Protective Equipment (PPE): From a chemical perspective, is any form of protection to prevent a hazardous chemical from entering one's body. PPE varies depending on the route of entry it is designed to protect. The most common forms of chemical PPE are designed to protect from inhalation, dermal, and eye contact exposures.

Physical Hazard: A chemical that can pose a bodily harm hazard by the actions of explosion, combustion, flammability, reactivity, corrosion, pressurization, and radioactivity.

Physical State: Are the three basic states of a chemical and include solid, liquid, and gas.

Poison or Poisonous: Are terms synonymous with the word "Toxic".

Odor Threshold: The lowest concentration of a particular chemical that can be detected by the human sense of smell.

OSHA: Federal Occupational Safety and Health Administration.

Oxidizer: A chemical other than a blasting agent or explosive that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

Route of Entry: This is the way a chemical enters one's body and includes inhalation, ingestion, injection, and absorption.

SDS: Safety Data Sheet.

Synergistic Effect: A synergistic effect, from a toxicological viewpoint, is the effect of a primary toxin with a secondary toxin or condition that speeds up the on-set of symptoms, disease, or death.

Target Organ: A specific body organ that is effected by a toxin.

Toxic or Toxicity: A chemical, or the ability of a chemical, to cause harmful health effects.

TWA: Is a Time Weighted Average and is a calculation used to determine an exposure level.

VOC's: Volatile Organic Compounds are carbon-based chemicals that have a high vapor pressure that evaporate readily at room temperature.